



the Skyscraper

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AMATEUR ASTRONOMICAL SOCIETY OF RHODE ISLAND * 47 PEEPTOAD ROAD * NORTH SCITUATE, RHODE ISLAND 02857 * WWW.THESKYSCRAPERS.ORG

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Friday, November 6, 7:00pm at Seagrave Memorial Observatory

The Revival of the 1965 Princeton Boller and Chivens 36" Telescope by Alan Sliski

The Revival of the 1965 Princeton Boller and Chivens 36" Telescope

This talk will present some of the recent work going into the revival effort by several Antique Telescope Society members of the Boller and Chivens 36 inch telescope made for Princeton University in 1965. The telescope was last used in 2002 for the targeted optical SETI program in collaboration with the 61 inch Fecker telescope at Harvard's oak ridge observatory. The disassembly and rigging coincided with the 75th anniversary of Orson Wells war of the world broadcast, where they mention the "Princeton observatory". The FitzRandolph Observatory was built for a 23-inch Clark refractor, installed in 1882 and the 36-inch replaced it in 1965. Pictures of the disassembly in preparation for the riggers will be shown,

and some plans for the new Newtonian optical configuration and custom observatory building in New Mexico will be shown.

Alan Sliski is an inventor with 28 patents. He is an expert in new and old-school electronic, medical, mechanical, and optical research & development. Some of Alan's major interests are novel radiation therapy system design, precision measuring systems for the physical sciences, analog electronics, servo systems, magnetics, electron optics, high vacuum and light optics. He is very interested in engineering new astronomical projects and restoring antique telescopes and is a very active member of the Antique Telescope Society and the Amateur Telescope Makers of Boston.

Phases of the Moon

Last Quarter Moon
November 3 12:14

New Moon
November 11 17:47

First Quarter Moon
November 19 06:27

Full Beaver Moon
November 25 22:44



Seagrave
Memorial
Observatory
Open Nights

Saturday's at 7:00 pm
weather permitting

President's Message

by Bob Horton

Although it was cloudy, cool, and even raining at times, this year's AstroAssembly was a lot of fun. Many people commented about how great all of the speakers were, and that they enjoyed the variety of topics presented. I could not agree more! On behalf of Skyscrapers, I wish to thank all of our speakers that contributed their time to provide us with such a fine program.

Talks were held in our meeting hall this year, rather than holding them outside under a large tent as we had done for the past decade. The expense of renting a tent had steadily increased over the years and was costing us nearly \$800. Due to the efforts of the trustees and other volunteers over the course of the last year, our meeting hall was cleaned up and reorganized in order to accommodate all of our Astro Assembly

attendees. Having the talks in the meeting hall, complete with heat, provided us with much comfort during the cold and damp day. Thanks again to all of you that helped getting our meeting hall ready for AstroAssembly. You made everyone very comfortable and helped us to save a lot of money, too!

Another great improvement to this year's AstroAssembly was the gazebo built by Alex Bergemann for his Eagle Scout project. We used this space for our grills, which provided our volunteers with much comfort whenever it rained. Alex, thanks again for our new gazebo!

Much effort goes into getting ready for AstroAssembly each year, and we could not do this without the help of so many volunteers. In addition to contacting potential

speakers and arranging a program, our buildings need to be cleaned, grass needs to be cut, registrations collected, tents, tables and chairs set up, food prepared, and much more. On behalf of Skyscrapers, I wish to again thank all of our volunteers that contributed their time to help out making Astro Assembly so enjoyable.

Linda Bergemann and Tina Huestis spent a lot of time out in the damp cool air of the registration tent. You deserve special thanks for volunteering your time and braving the cold!

Our co-chairs, Steve and Kathy Siok, did a great job helping to organize this event. And as soon as AstroAssembly was done, they were already thinking about some ideas for next year. If you think you might be interested in helping to organize next year's AstroAssembly, please talk to Kathy or Steve at one of our upcoming meetings. I know that they would love to hear from you.

Saturday, November 7: Astronomy Workshop Week 2: The Beauty of the Night

Saturday, November 7th, 2015, 6:00 P.M.
Seagrave Memorial Observatory
47 Peepoad Road, North Scituate, RI
Contact: Robert Horton, President: ShootingSta98@gmail.com

Have you ever looked up at the night sky, and wondered what stars you were seeing? What constellation patterns are being made overhead? This workshop will introduce you to the skies of late fall and winter, by

showing you, step by step, how, by beginning at the Big Dipper, to find your way through the nighttime sky.

And, weather permitting, Seagrave observatory will be open to the public after the workshop is over. You might want to stay and enjoy the sky with others who love looking up, and find your new celestial friends.

This program is just \$5.00 per person,

free to Skyscrapers, Inc., members. For more information, please contact President Bob Horton, at ShootingSta98@gmail.com.

Skyscrapers, Inc., the Amateur Astronomical Society of Rhode Island, is a non-profit organization begun in 1932 by Brown University Professor Charles Smiley. Its mission is to educate its membership and the public on all matters pertaining to astronomy. For more information concerning the organization, please visit our website at www.theskyscrapers.org



The Skyscraper is published monthly by Skyscrapers, Inc. Meetings are held monthly, usually on the first or second Friday or Saturday of the month. Seagrave Memorial Observatory is open every Saturday night, weather permitting.

Directions

Directions to Seagrave Memorial Observatory are located on the back page of this newsletter.

Submissions

Submissions to *The Skyscraper* are always welcome. Please submit items for the newsletter no later than **November 20** to Jim Hendrickson, 1 Sunflower Circle, North Providence, RI 02911 or e-mail to jim@distantgalaxy.com.

E-mail subscriptions

To receive *The Skyscraper* by e-mail, send e-mail with your name and address to jim@distantgalaxy.com. Note that you will no longer receive the newsletter by postal mail.

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Friday, November 13: Star Party in Portsmouth

Jim Crawford is looking for help with a star party in Portsmouth on Friday, November 13th. All who are able to come are

asked to contact him. Everyone knows that doing parties such as these is really fun, and they introduce people to both the sky and

the organization. Please, if you have the night free, come join us in beautiful Portsmouth. Let Jim know at jcrawford@cox.net

Saturday, November 14: Astronomy Workshop Week 3: The language of sky observing

Saturday, November 14th, 2015, 6:00 P.M.
Seagrave Memorial Observatory
47 Peepetoad Road, North Scituate, RI
Contact: Robert Horton, President: ShootingSta98@gmail.com

You've become more interested in enjoying the beauty of the sky, but there seems to be so many new words to learn. What is right ascension? Ecliptic? How do they fit in with the sky?

Steve Siok, an amateur astronomer for

over forty years, will put all of the language of the sky together. After taking this workshop, you will be talking astronomy and enjoying it so much more.

Also, weather permitting, Seagrave observatory will be open to the public after the workshop is over. You might want to stay and enjoy the sky with others who love looking up.

This program is just \$5.00 per person, free to Skyscrapers, Inc., members. For

more information, please contact President Bob Horton, at stargazerbob@aol.com

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Friday, November 20: Stars of the Pharaohs at the University of Rhode Island Planetarium

University of Rhode Island Planetarium
Upper College Road, Kingston, RI
Friday, November 20, 2015
6:00 P.M.

Contact: Francine Jackson: 401-527-5558

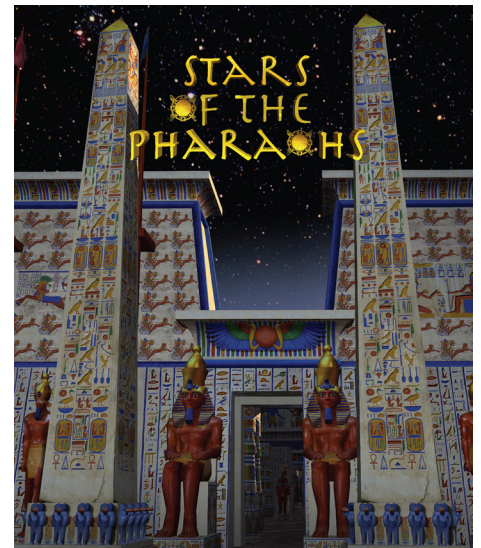
Travel to ancient Egypt to see how science was used to tell time, make a workable calendar, and align huge buildings.

You'll learn about the connection the ancient Egyptians felt with the stars and various astronomical phenomena, and experience some of the most spectacular temples and tombs of the ancient world recreated in all of their original splendor.

In addition to the featured presentation, *Losing the Dark*, a short introduction to light and its problems in our society will be given, as well as a tour of The Skies above the URI campus.

Admission to this presentation is \$5.00, to benefit the URI Planetarium Fund. The URI Planetarium is on Upper College Road, at the end of Engineering Row and across the parking lot from East Hall.

The University of Rhode Island Planetarium is available for programs of many varied topics of astronomical interest. For more information, please call 401-527-5558.



Saturday, November 28: Skyscrapers Trip to Mystic Seaport

In 1707 the British royal navy lost 4 ships and 1600 men because the Admiral did not know he was off course and grounded his fleet. As a result in 1714 Parliament passed the Longitude Act, authorizing a huge prize to the person who could solve the problem of finding Longitude at sea.

In commemoration of the 300th anniversary of the Act, the Royal Greenwich Museum has produced the exhibition, "Ships, Clocks and Stars". It is now showing at Mystic Seaport and **this is its only North American venue.**

Do not miss the opportunity to see this exhibit with your fellow Skyscrapers. I am

trying to assemble a tour. Based on members availability we will go on Saturday November 28. This is the Saturday after Thanksgiving. We will carpool to Mystic and tour the exhibit, visit the planetarium for a show on Capt. James Cook's circumnavigation using a chronometer in the 1760's and tour the rest of the museum grounds. We will end the day with dinner at the Tavern at Longitude 41, the restaurant at the Seaport. If we get a group of 10 people, we will get a \$5 discount for museum entrance. So the cost will be \$20 per person. The cost for the Planetarium Show is \$3.50.

Please send me an e-mail if you are in-

terested in going. The only hitch with the discount is that I must buy the tickets all at the same time, so this is not refundable. If you later choose to cancel you must find a replacement person. I will be buying the tickets about a week before the trip. My e-mail address is ssiok@cox.net. If you want more info about the Seaport go to their website, MysticSeaport.org. For the menus at the restaurant go to its website, Latitude 41.com.

Hope to hear from lots of you.

Steve Siok ssiok@cox.net

Astronomical Highlights for November

by Dave Huestis

I love the cool nights of November. The hazy skies of late summer are gone, and amateur astronomers can begin their evening observing sessions after dinnertime, courtesy of earlier sunsets.

But just as we are gradually growing accustomed to shorter daylight hours, most of the United States will transition back to Eastern Standard Time (EST) from Daylight Saving Time (DST). This year that switch occurs at 2:00 a.m. on Sunday, November 1. Nothing in the heavens changes. We are simply setting our clocks back one hour. “Spring ahead and fall back/behind” is the expression created to help us remember when this practice is put into effect. This bi-annual ritual takes a few days to get used to. At least we can look forward to an extra hour of sleep. Don’t forget to reset all your clocks else you will be an hour early for any Sunday morning event.

The morning sky before sunrise will continue to display Venus, Jupiter and Mars. On the morning of November 2 you will find dim reddish Mars less than one degree (one Full Moon diameter) from brilliant Venus. Jupiter will be just above this duo. Each morning Mars and Venus will move farther apart. On the morning of the 7th, a beautiful waning crescent Moon will join the sky scene, providing a great opportunity to snap a few images.

Throughout the month, if you decide to visit one of the local observatories, ask any of the telescope operators to show you the two most distant planets of our solar system. Since the demotion of Pluto to dwarf planet status in 2006, those planets are Ura-

nus and Neptune. These gas giants look like little blue-green disk through a telescope. You won’t see any detail, but you can boast of catching a glimpse of two distant worlds.

During the first two weeks of November we may experience more very bright meteors called fireballs from the Taurid (Northern and Southern) meteor showers. One expert forecasts the Earth will pass through a dense band of debris left in orbit by Comet Encke. While you can concentrate your gaze toward the constellation Taurus the Bull (find the V-shaped pattern that defines the bull’s face, or locate the Pleiades – the Seven Sisters), the Taurids can appear anywhere in the sky. So don’t forget to scan around. These fireballs are fairly slow and enter our atmosphere at approximately 17 miles per second. Taurids are yellow in color, and often explode and fragment into multiple meteors.

Another meteor shower peaks on the night of November 17-18. It is the famous Leonids, noted for a breath-taking storm level display back in 2001. Unfortunately the peak rate is down to its normal level of perhaps 10-15 green or blue shooting stars per hour. The Leonids blaze across the sky at around 44 miles per second as they hit the Earth’s atmosphere nearly head-on. The resulting display produces many fireballs, with about half of them leaving trains of dust which can persist for minutes.

The area of sky where the meteors appear to radiate from is in the Sickle (backwards question mark) asterism in Leo. A waxing crescent Moon (one day before First Quarter) will set around 10:00 p.m., so it will not

interfere with observing the best part of the display from midnight to dawn.

You may remember I reported on the Moon passing in front of (occluding) Taurus’ brightest star Aldebaran back on September 4-5 around midnight. Another occultation of Aldebaran by a waning gibbous Moon will occur on November 26. Locally Aldebaran will disappear behind the left-hand side of the lunar limb at approximately 5:44 a.m., situated 15 degrees above the western horizon. At approximately 6:31 a.m. Aldebaran will reappear on the right-hand side while just 5.5 degrees above the horizon. Search out a good vantage point ahead of time from which to observe this event.

And finally, more than a million years ago a comet was nudged out of the vast Oort Cloud of comets that encompasses our solar system. This first time visitor to the inner solar system will pass closest to the Sun (perihelion) on November 15, when it will be at a distance of about 76,000,000 miles. Until that time Comet Catalina (C/2013 US10) can only be seen from the southern hemisphere. After perihelion it will emerge from the solar glare low in the early morning sky. It may reach magnitude +4.0, which means it could possibly be seen with the naked-eye from a light pollution-free location. Binoculars or a telescope will enhance the view, especially when attempting to spot the comet’s dusty tail. As Comet Catalina heads out back into deep space it will come no closer to the Earth than approximately 67,000,000 miles on January 17, 2016.

If you observe the Aldebaran occultation on the 26th and have both a good western and eastern horizon, turn 180 degrees around and see if you can spot the comet above the eastern horizon. Catalina will rise higher and higher each morning, but it will begin to fade. From December 6-8 it will be less than five degrees to the left of Venus at 5:45 a.m.

Don’t forget to visit the local observatories below to explore the heavens through the largest telescopes in Rhode Island. The telescope operators are more than happy to share their love of the sky with you.

Seagrave Memorial Observatory in North Scituate is open to the public every clear Saturday night. Ladd Observatory



in Providence is open every clear Tuesday night. The Margaret M. Jacoby Observatory at the CCRI Knight Campus in Warwick is open every clear Wednesday night. Frosty Drew Observatory in Charlestown is open every clear Friday night year-round.

Be sure to check the websites of these facilities before venturing out for a visit.

Keep your eyes to the skies.



Dave Huestis is Skyscrapers Historian and has been contributing monthly columns to local newspapers for nearly 40 years. See more at <http://theskyscrapers.org/dave-huestis>

Planetary Nebula in Aquarius

NGC 7009: (Saturn Nebula)

by Glenn Chaple

An entry in my astronomy logbook dated October 6, 1977 reads, “I finally notched a real stinker!” No, it wasn’t one of the skunks that occasionally stroll across my back yard while I’m outside observing. My notes continue, “After numerous attempts to see the planetary nebula NGC 7009 (Saturn Nebula), I tried tonight using 60X. To my surprise, a relatively bright, bluish star would not focus clearly. When I obtained clear focus on a nearby star of similar magnitude, I returned to the mystery object. It was still “out of focus”! The elusive nebula had passed as a “star” all the time! I had to chuckle. Hopefully, I will be more careful in searches for other planetaries.”

I was. In rapid order, my trusty 3-inch f/10 reflector and I picked off the planetaries NGC 7662 (the Blue Snowball) in Andromeda and NGC 6826 (the Blinking Planetary) in Cygnus.

NGC 7009 was discovered by William Herschel in 1782. When William Parsons,

the third Earl of Rosse, viewed it in the 1840s with his 72-inch reflector, the Leviathan of Parsonstown, he noticed fine lines, or ansae, stretching out to the sides. The visual similarity to the planet Saturn led Parsons to give the nebula its present-day nickname.

The Saturn Nebula shines at magnitude 8.3 and sports angular dimensions of 45” by 25” - slightly larger than its namesake planet. Estimates of its distance are all over the map, ranging from as little as 1400 light years to as much as 5200 light years.

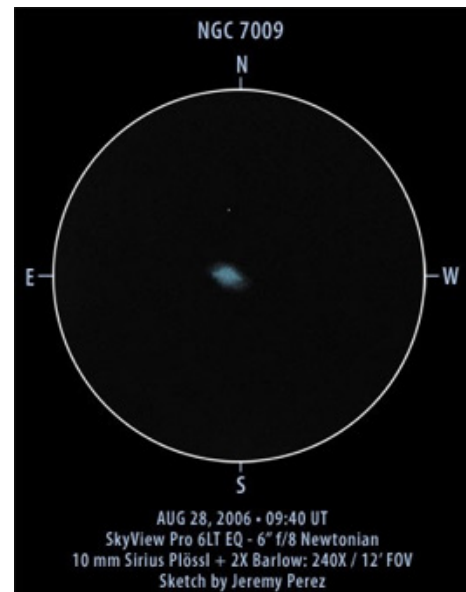
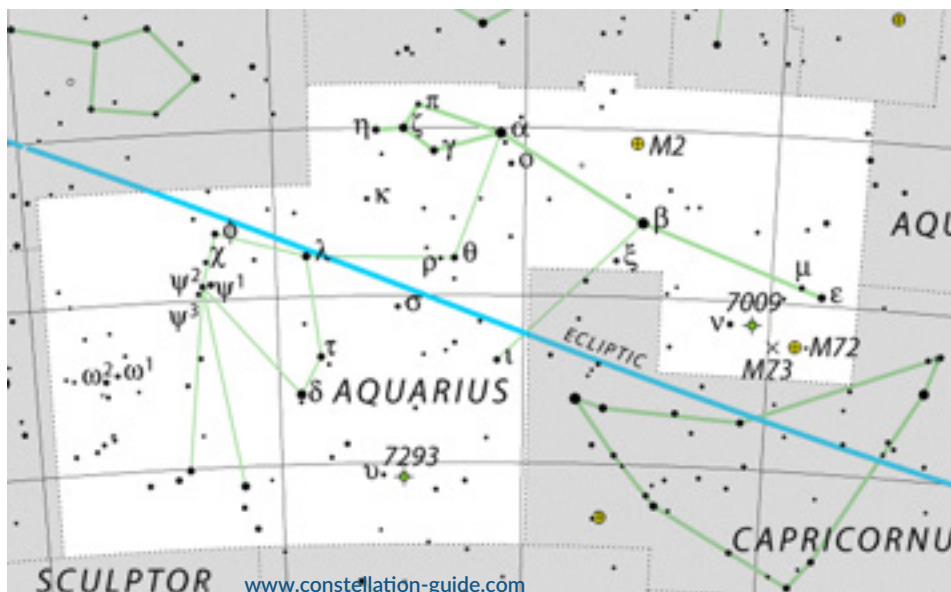
The best way to find the Saturn Nebula is to point your telescope at the 4.5 magnitude star nu (ν) Aquarii. Using a magnification of 50-75X, move a little over a degree west until a bluish star appears in the field. Then, jack up the magnification as high as your telescope and seeing conditions allow. Under ideal skies, telescopes as small as 6-inches might capture the ansae and 12th magnitude central star. Much larger

apertures will be a must when the Saturn Nebula is observed from typical suburban locations.

Recently, I revisited the Saturn Nebula, this time with a 10-inch f/5 reflector and magnifying power of 208X. It was definitely elongated, but I was unable to see the ansae or central star (the limiting magnitude that night was 5.0). By chance, someone nearby was viewing the planet Uranus. I jumped at the chance to make a color comparison. Like the Saturn Nebula, it sported a pale blue color. On occasions when its ansae aren’t visible, we could aptly refer to NGC 7009 as the “Uranus Nebula.”



Glenn Chaple is a member of the Amateur Telescope Makers of Boston, American Association of Variable Star Observers, and contributes the monthly “Observing Basics” column for Astronomy Magazine. See more at <http://theskyscrapers.org/glenn-chaple>



Star Party Update

Women's Wilderness Weekend URI W. Alton Jones Campus, October 16

Bob Horton, Steve Siok, Jim Crawford and Jim Hendrickson set up telescopes at the Environmental Education Center at URI's W. Alton Jones campus on Friday night for Women's Wilderness Weekend.

After the waxing crescent Moon and Saturn set early in the west, the 30 or so guests were treated to exceptionally dark skies through which we viewed double stars, globular clusters, the Andromeda Galaxy and the Pleiades.

Jim Hendrickson

Star Party at River Bend Farm Uxbridge, MA, Saturday October 17

Ian Dell'Antonio, Jim Hendrickson, and Kent and Connie Cameron showed the night sky to about 45 guests at River Bend Farm in Uxbridge, Ma on Saturday night, October 17. A waxing crescent Moon was visible, and an early, favorable pass of the International Space Station was seen by an enthusiastic group. Double stars, Uranus and Neptune and the Andromeda Galaxy were also viewed.

Jim Hendrickson

Rhode Island State House Lawn, October 10 White House Astronomy Night Rhode Island State House Lawn, October 19

Skyscrapers, Inc., has found a great new way to place to observe – the southeast corner of the State House lawn. Thanks to the efforts of Kim Arcand of Chandra Observatory, who was able to contact and receive approval from coordinator Deborah White, the organization was able to set over a dozen portable telescopes on the lawn, as part of White House Astronomy Night. Lieutenant Habershaw of the Capitol Police agreed to our request for the placement right next to the parking lot, for easy transport of our equipment, and made sure we had cones to block a depression on that part of the lawn.

Over 75 people came to view the Moon, Neptune, Albireo, and all other sights able to be seen from the city sky before clouds came an hour after setup. We were also able to witness an early Iridium flare, and watch the International Space Station appear from behind the State House rotunda. The public who came marveled at the telescopes and the clarity of the views they were able to see, despite being virtually across the street from the Providence Place Mall.

Although it does sound like a very unique place to set up a fair number of telescopes – we're always looking for dark skies – the State House lawn showed us that even in a city, the public can become amazed with telescopic observations, and we were probably capturing an audience we had never had before. This night proved so much fun, and the members of the State House who helped us put this together seemed so enthused to have this happen, that we are seriously thinking of doing it again. Our only regret is that we didn't have members of our legislation or the Rhode Island Department of Education take the time to come and see informal education right on their backyard.

Francine Jackson

Dear Bob, Francine, and everyone who attended last night,

Thank you so much for coming out for the RI Star Party at the State House. It was a lovely evening and everyone seemed to enjoy themselves very much. Thanks for all the great organizing and rallying! Here is a brief that I sent in for reporting to the White House and NASA, as well as the State House and Sen. Jack Reed's office. I posted it to the event page on Facebook as well.

Clear skies,

Kim

Star Party at RI State House

White House AstronomyNight 2015

Many thanks to all that attended!

Approximately 75 members of the public attended the first RI Star Party held at the State House, on October 19, 2015. Celebrating the White House #AstronomyNight as well as the International Year of Light 2015, over a dozen professional and amateur astronomers participated from Brown University, SkyScrapers, Inc. and Frosty Drew Observatory. Hosted with NASA's Chandra X-ray Observatory Center, the event was attended by local media/bloggers, a representative from Senator Jack Reed's office, meteorologist TJ Del Santo and local students. NASA handouts were distributed, with Q&As on light and astronomy. The weather was chilly but the skies were crystal clear for most of the evening while participants took in views of our Moon in stunning detail as well as Uranus, Vega, other star systems, and a timely passing of the International Space Station just over the State House.

Our 2015 White House Star Party at the State Capitol in RI on October 19th was a great success! This was mainly attributed to our friend Kim Arcand! Her dedication and enthusiasm coupled with her collaborative efforts with Senator Jack Reed and Governor Gina Raimondo's office, WPRI's "The Rhode Show", Meteorologist T.J. Del Santo, and Francine Jackson's press releases helped immensely to advertise this event to the public.

Skyscrapers Inc. Members Bob Horton, Steve and Kathy Siok, Jim Hendrickson, Francine Jackson, Kent Cameron, myself, (Jim add other Skyscraper members I missed here thank you), Scott MacNeill from Frosty Drew Observatory made this "Spectacular" event possible! Many handouts were printed out and provided to the public by Jim Hendrickson and our other Skyscraper members. Jim Hendrickson's photos captured the event as it unfolded and were selected by Kim Arcand to send to the White House and NASA along with her narrative! Many Kudos to Jim!

My reward for attending were the children and adults alike that were totally amazed at looking at the clear night sky for the very first time through one of the many telescopes and binoculars that were made available! Many of the public were taking photos of the images from our scopes with their smartphones and asking many inquisitive questions!

The children were especially impressionable and excited to see the moon and the double stars in the Constellation Cygnus! (Jim add other objects were observed here...thank you).

We had the ISS passing by which added to the excitement on a very unusually clear night in Providence, thanks to Meteorologist T.J. Del Santo keeping the clouds away for several hours. Even with the light pollution from the city, we were able to capture those im-

ages that will forever live in the minds of those that peered through our scopes! Maybe one day because of this event, we'll have generated enough interest for one of the many children that attended to become the next Astronaut like Neil Armstrong or Sally Ride, an Astrophysicist like Dr. Neil deGrasse Tyson, an Astronomer like Carl Sagan, or someone like Kim Arcand NASA's Vitalization Lead for the Chandra X-Ray telescope (I refer to Kim as "The Presenter

of Light!"). Who knows what this night has done for our children and humanity's future! I would like to thank everyone that made this event possible with their unselfish volunteerism and providing their personal time and equipment to make this such a wonderful educational experience for all! This is just the "Beginning" for many more "Great" Star Party's to come! Tracy Karin Prell

Photos by Jim Hendrickson & Tracy Prell



The Sun, Moon & Planets in November

This table contains the ephemeris of the objects in the Solar System for each Saturday night in November. Times are in Eastern Daylight Time calculated for Seagrave Observatory (41.845N, 71.590W).

Object	Date	RA	Dec	Const	Mag	Size	Elong	Phase(%)	Dist(S)	Dist(E)	Rise	Transit	Set
Sun	7	14 47.1	-16 06.8	Lib	-26.8	1,936.3	-	-	-	0.99	06:25	11:30	16:34
	14	15 15.4	-18 04.7	Lib	-26.8	1,939.5	-	-	-	0.99	06:34	11:30	16:27
	21	15 44.4	-19 47.3	Lib	-26.8	1,942.5	-	-	-	0.99	06:42	11:32	16:21
	28	16 14.0	-21 12.2	Sco	-26.8	1,945.2	-	-	-	0.99	06:50	11:34	16:17
Moon	7	11 30.6	1 42.0	Leo	-10.7	1,752.1	52° W	19	-	-	02:22	08:37	14:45
	14	17 03.0	-18 27.0	Oph	-9.4	1,819.1	26° E	5	-	-	08:58	14:00	19:01
	21	23 25.6	-3 37.6	Aqr	-12.3	1,975.5	113° E	69	-	-	13:51	20:06	02:30
	28	6 14.1	17 43.3	Ori	-12.6	1,917.2	152° W	94	-	-	19:19	02:41	09:58
Mercury	7	14 22.9	-13 12.7	Lib	-0.9	4.9	7° W	98	0.42	1.39	05:53	11:07	16:20
	14	15 07.0	-17 21.4	Lib	-0.9	4.7	2° W	100	0.45	1.44	06:26	11:23	16:20
	21	15 51.9	-20 48.6	Sco	-0.8	4.6	2° E	100	0.46	1.45	06:57	11:41	16:23
	28	16 38.0	-23 25.4	Oph	-0.7	4.7	6° E	99	0.47	1.44	07:27	11:59	16:31
Venus	7	11 55.1	1 37.7	Vir	-4.2	21.7	46° W	56	0.72	0.78	02:29	08:38	14:45
	14	12 23.8	0 58.3	Vir	-4.1	20.3	45° W	60	0.72	0.83	02:40	08:39	14:37
	21	12 53.1	-3 42.5	Vir	-4.1	19.1	45° W	63	0.72	0.88	02:51	08:40	14:29
	28	13 23.2	-6 30.8	Vir	-4.1	18.1	44° W	66	0.72	0.94	03:04	08:43	14:21
Mars	7	11 49.1	2 42.1	Vir	1.7	4.3	48° W	95	1.67	2.16	02:19	08:31	14:42
	14	12 04.7	1 02.4	Vir	1.6	4.4	51° W	94	1.67	2.11	02:12	08:18	14:24
	21	12 20.1	0 36.4	Vir	1.6	4.6	54° W	94	1.67	2.05	02:06	08:06	14:06
	28	12 35.4	-2 14.0	Vir	1.6	4.7	56° W	93	1.67	1.99	02:00	07:54	13:48
1 Ceres	7	20 28.0	-28 33.4	Mic	9.1	0.4	78° E	97	2.97	3.01	13:01	17:08	21:15
	14	20 35.6	-27 56.8	Mic	9.2	0.4	73° E	97	2.97	3.11	12:38	16:48	20:58
	21	20 43.8	-27 17.7	Cap	9.2	0.4	68° E	98	2.97	3.20	12:15	16:29	20:42
	28	20 52.5	-26 36.1	Cap	9.2	0.4	63° E	98	2.98	3.29	11:53	16:10	20:27
Jupiter	7	11 16.4	5 47.4	Leo	-1.7	33.4	57° W	99	5.4	5.89	01:34	07:57	14:20
	14	11 20.4	5 23.3	Leo	-1.7	34	62° W	99	5.41	5.79	01:12	07:33	13:55
	21	11 24.1	5 01.4	Leo	-1.8	34.6	69° W	99	5.41	5.69	00:49	07:10	13:30
	28	11 27.4	4 42.0	Leo	-1.8	35.2	75° W	99	5.41	5.58	00:26	06:45	13:04
Saturn	7	16 12.5	-19 26.8	Sco	0.5	15.2	21° E	100	10.00	10.93	08:03	12:52	17:41
	14	16 15.9	-19 35.9	Sco	0.5	15.1	14° E	100	10.00	10.96	07:40	12:28	17:16
	21	16 19.3	-19 44.9	Sco	0.5	15.1	8° E	100	10.01	10.98	07:16	12:04	16:52
	28	16 22.7	-19 53.6	Sco	0.5	15.1	2° E	100	10.01	10.99	06:53	11:40	16:27
Uranus	7	1 05.6	6 15.4	Psc	5.7	3.7	153° E	100	19.98	19.09	15:19	21:43	04:08
	14	1 04.7	6 10.2	Psc	5.7	3.7	146° E	100	19.98	19.15	14:51	21:15	03:39
	21	1 03.9	6 05.6	Psc	5.7	3.7	139° E	100	19.98	19.23	14:23	20:47	03:11
	28	1 03.3	6 01.8	Psc	5.8	3.6	131° E	100	19.98	19.31	13:55	20:19	02:42
Neptune	7	22 36.3	-9 40.2	Aqr	7.9	2.3	113° E	100	29.96	29.56	13:48	19:15	00:42
	14	22 36.2	-9 40.8	Aqr	7.9	2.3	106° E	100	29.96	29.68	13:20	18:47	00:14
	21	22 36.2	-9 40.8	Aqr	7.9	2.3	99° E	100	29.96	29.80	12:52	18:19	23:47
	28	22 36.3	-9 40.2	Aqr	7.9	2.3	92° E	100	29.96	29.92	12:25	17:52	23:19
Pluto	7	18 57.6	-21 04.1	Sgr	14.3	0.2	59° E	100	32.98	33.48	10:55	15:37	20:19
	14	18 58.3	-21 04.1	Sgr	14.3	0.2	52° E	100	32.98	33.58	10:28	15:10	19:52
	21	18 59.0	-21 04.0	Sgr	14.3	0.2	45° E	100	32.99	33.67	10:01	14:43	19:25
	28	18 59.9	-21 03.7	Sgr	14.3	0.2	39° E	100	32.99	33.76	09:34	14:16	18:54



How we know Mars has liquid water on its surface

by Ethan Siegel

Of all the planets in the solar system other than our own, Mars is the one place with the most Earth-like past. Geological features on the surface such as dried up riverbeds, sedimentary patterns, mineral spherules nicknamed “blueberries,” and evidence of liquid-based erosion all tell the same story: that of a wet, watery past. But although we’ve found plenty of evidence for molecular water on Mars in the solid (ice) and gaseous (vapor) states, including in icecaps, clouds and subsurface ices exposed (and sublimated) by digging, that in no way meant there’d be water in its liquid phase today.

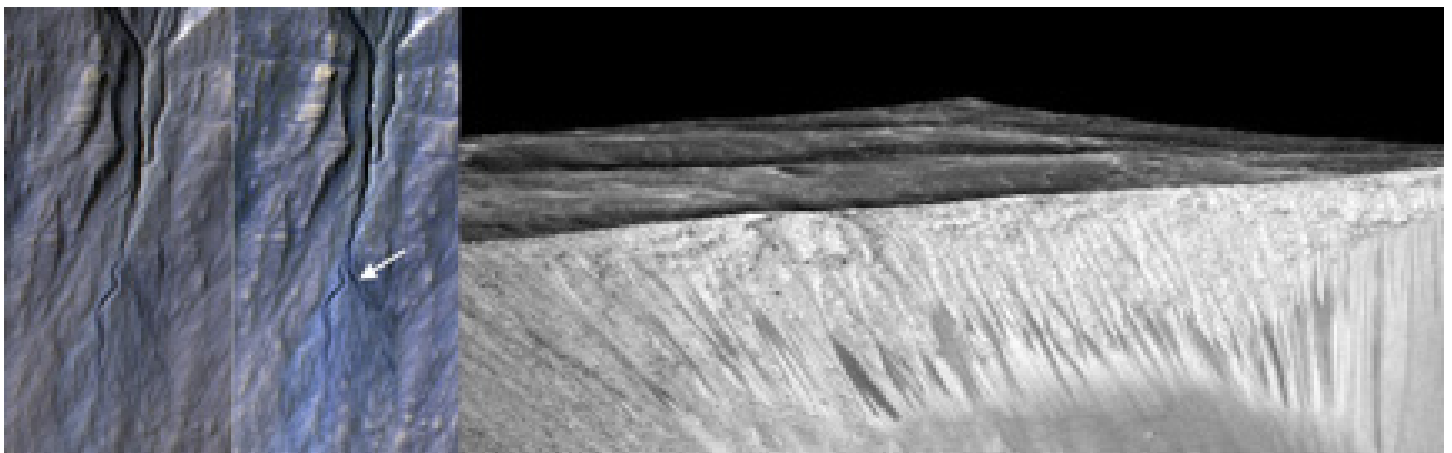
Sure, water flowed on the surface of Mars during the first billion years of the solar system, perhaps producing an ocean a mile deep, though the ocean presence is still much debated. Given that life on Earth took hold well within that time, it’s conceivable that Mars was once a rich, living planet

as well. But unlike Earth, Mars is small: small enough that its interior cooled and lost its protective magnetic field, enabling the sun’s solar wind to strip its atmosphere away. Without a significant atmosphere, the liquid phase of water became a virtual impossibility, and Mars became the arid world we know it to be today.

But certain ions—potassium, calcium, sodium, magnesium, chloride and fluoride, among others—get left behind when the liquid water disappears, leaving a “salt” residue of mineral salts (that may include table salt, sodium chloride) on the surface. While pure liquid water may not persist at standard Martian pressures and temperatures, extremely salty, briny water can indeed stay in a liquid state for extended periods under the conditions on the Red Planet. It’s more of a “sandy crust” like you’d experience on the shore when the tide goes out than the flowing waters we’re used to in

rivers on Earth, but it means that under the right temperature conditions, liquid water does exist on Mars today, at least in small amounts.

The measured presence and concentration of these salts, found in the dark streaks that come and go on steep crater walls, combined with our knowledge of how water behaves under certain physical and chemical conditions and the observations of changing features on the Martian surface supports the idea that this is the action of liquid water. Short of taking a sample and analyzing it in situ on Mars, this is the best current evidence we have for liquid water on our red neighbor. Next up? Finding out if there are any single-celled organisms hardy enough to survive and thrive under those conditions, possibly even native to Mars itself!



NASA/JPL-Caltech/Univ. of Arizona, of a newly-formed gully on the Martian surface (L) and of the series of gullies where the salt deposits were found (R).

Total Lunar Eclipse

September 27



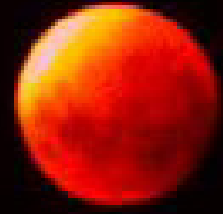
Lunar eclipse montage taken by Tom Thibault with a Canon T3i with a 85-250 zoom at 250. Composed with Photoshop.



Skyscrapers gather to observe the eclipse. Photo by Tracy Prell.



Jim Crawford observing & photographing the later stages of the eclipse



Totality photo by Ed Turco.





Jim Hendrickson thought it would be fun to shoot M31 the Andromeda Galaxy during a full Moon (totally eclipsed).



Totality by Jim Hendrickson



Just after P2 umbral first contact by Tracy Prell.

Bob Horton took this composite image of the eclipse with a Rapid Omega medium format camera.





October's Planet Show



October 28 by Tom Thibault



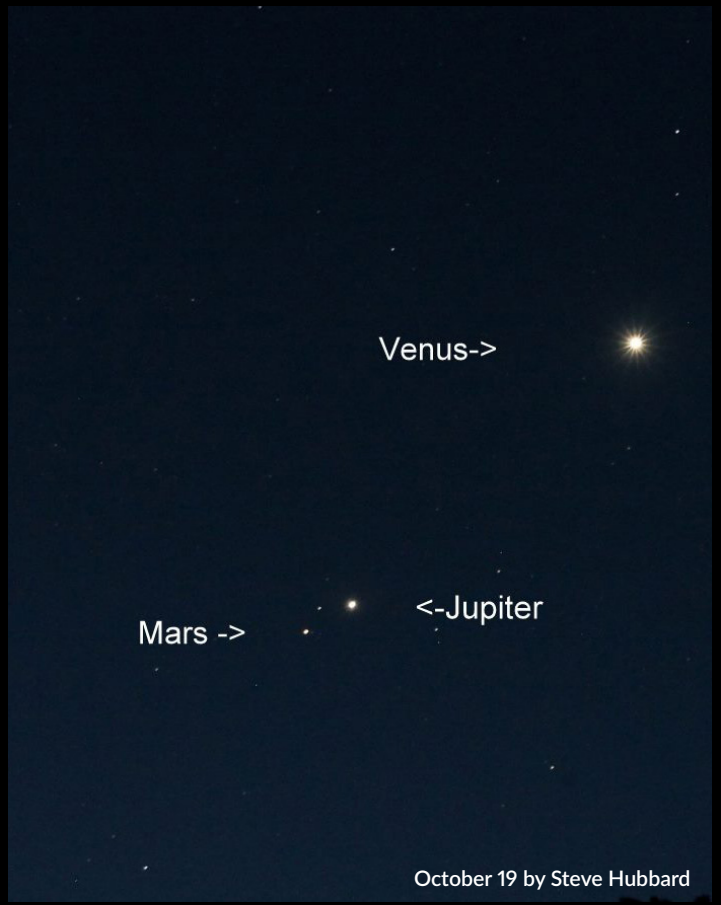
October 28 by Tom Thibault



October 8 by Jim Hendrickson



October 8 by Bob Horton



October 19 by Steve Hubbard



October 24 by Bob Horton



Directions to Seagrave Memorial Observatory

From the Providence area:

Take Rt. 6 West to Interstate 295 in Johnston and proceed west on Rt. 6 to Scituate. In Scituate bear right off Rt. 6 onto Rt. 101. Turn right onto Rt. 116 North. Peeptoad Road is the first left off Rt. 116.

From Coventry/West Warwick area:

Take Rt. 116 North. Peeptoad Road is the first left after crossing Rt. 101.

From Southern Rhode Island:

Take Interstate 95 North. Exit onto Interstate 295 North in Warwick (left exit.) Exit to Rt. 6 West in Johnston. Bear right off Rt. 6 onto Rt. 101. Turn right on Rt. 116. Peeptoad Road is the first left off Rt. 116.

From Northern Rhode Island:

Take Rt. 116 South. Follow Rt. 116 thru Greenville. Turn left at Knight's Farm intersection (Rt. 116 turns left) and follow Rt. 116. Watch for Peeptoad Road on the right.

From Connecticut:

- Take Rt. 44 East to Greenville and turn right on Rt. 116 South. Turn left at Knight's Farm intersection (Rt. 116 turn left) and follow Rt. 116. Watch for Peeptoad Road on the right.
- or • Take Rt. 6 East toward Rhode Island; bear left on Rt. 101 East and continue to intersection with Rt. 116. Turn left; Peeptoad Road is the first left off Rt. 116.

From Massachusetts:

Take Interstate 295 South (off Interstate 95 in Attleboro). Exit onto Rt. 6 West in Johnston. Bear right off Rt. 6 onto Rt. 101. Turn right on Rt. 116. Peeptoad Road is the first left off Rt. 116.



47 Peeptoad Road
North Scituate, Rhode Island 02857